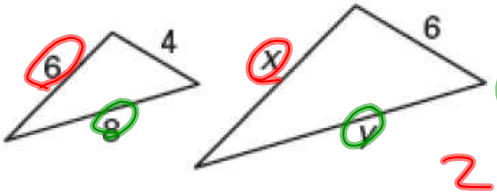
1. The ratio of the side lengths of the small Δ to the big Δ is 2:3. Find x and y.

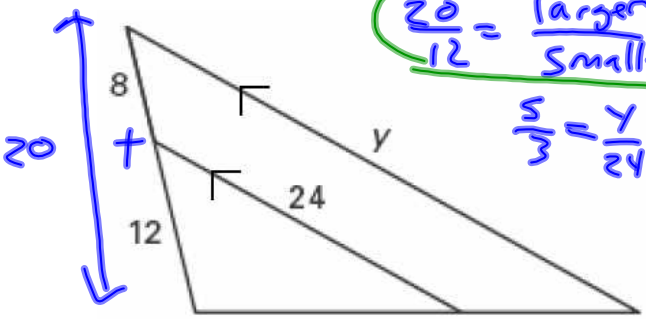


$\frac{2}{3} = \frac{\text{smaller}}{\text{larger}}$

$\frac{2}{3} = \frac{6}{x}$ $2x = 18$ $x = 9$

$\frac{2}{3} = \frac{8}{y}$ $2y = 24$ $y = 12$

2. Find y.



$\frac{20}{12} = \frac{\text{larger}}{\text{smaller}} = \frac{5}{3}$

$\frac{5}{3} = \frac{y}{24}$ $40 = y$

3. The triangles are similar. Which choice below is NOT a correct statement?

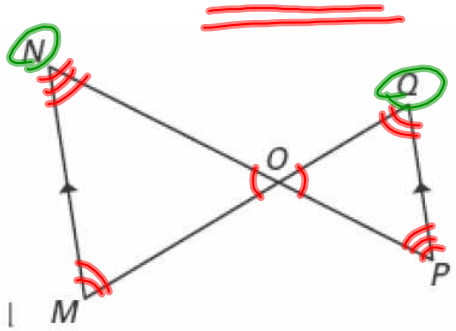
(A) $\angle N \cong \angle Q$ F

(B) $\Delta NOM \sim \Delta POQ$ T

(C) $\frac{NM}{QP} = \frac{NO}{OP}$ T

(D) $\frac{MO}{NO} = \frac{OQ}{OP}$ T

(E) $\angle M \cong \angle Q$ T



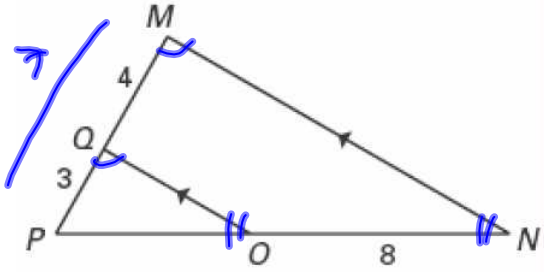
4. Which of the following statements is true?

(A) $\Delta PQO \sim \Delta PMN$ by SAS~ F

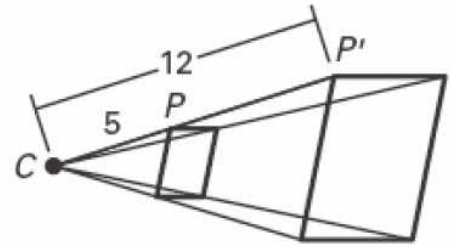
(B) $\Delta PQO \sim \Delta PMN$ by AA~ T

(C) $\Delta PQO \sim \Delta PMN$ by SSS~ F

(D) $\Delta PQO \sim \Delta PNM$ by AA~ F



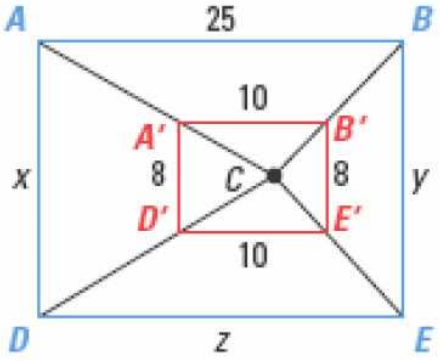
5. Identify the dilation and scale factor.



$\frac{new}{old} = \frac{CP'}{CP} = \frac{12}{5}$ = scale factor

enlargement

6. The dilation has center C. Find the values of x, y, and z.



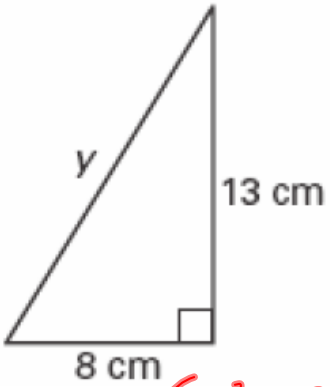
$\frac{new}{old} = \frac{A'B'}{AB} = \frac{10}{25} = \frac{2}{5}$

$\frac{2}{5} = \frac{8}{x}$ $2x = 40$ $x = 20$

$\frac{2}{5} = \frac{8}{y}$ $2y = 40$ $y = 20$

$\frac{2}{5} = \frac{10}{z}$ $2z = 50$ $z = 25$

7. Find the value of y. Round to the nearest tenth, if necessary.



$leg^2 + leg^2 = hyp^2$

$8^2 + 13^2 = hyp^2$

$64 + 169 = hyp^2$

$233 = hyp^2$

$\sqrt{233} = hyp = y$

$15.3 = y$

$c^2 = a^2 + b^2$ = right △

$c^2 < a^2 + b^2$ = acute △

$c^2 > a^2 + b^2$ = obtuse △

8. Which set of numbers can represent the side lengths of an obtuse triangle?

(A) 6, 9, 10 $10^2 ? 9^2 + 6^2$ $100 < 117$

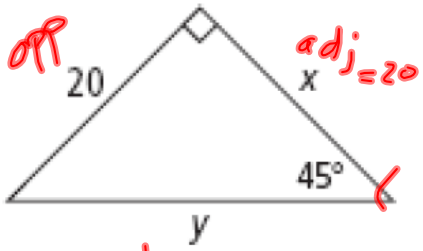
(B) 6, 10, 10 $10^2 < 10^2 + 6^2$

(C) 0.6, 0.8, 1.0 $1^2 ? .6^2 + .8^2$ $1 = 1$

(D) $\sqrt{8}$, 4, 6 $6^2 ? 4^2 + (\sqrt{8})^2$ $36 > 16 + 8$

9. Find the values of x and y. Express answers in simplest radical form.

(a)



opp
adj = 20
SOH
CAH
TOA
hyp

$\tan(45^\circ) = \frac{opp}{adj} = \frac{20}{x}$

$x = \frac{20}{\tan(45^\circ)} \rightarrow 1$

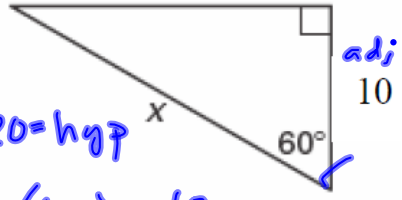
$x = 20$

$\sin(45^\circ) = \frac{20}{y}$

$y = \frac{20}{\sin(45)} \rightarrow 0.707$

$y = 28.3$

(b)



opp = 17.3
20 = hyp

$\cos(60^\circ) = \frac{10}{x}$

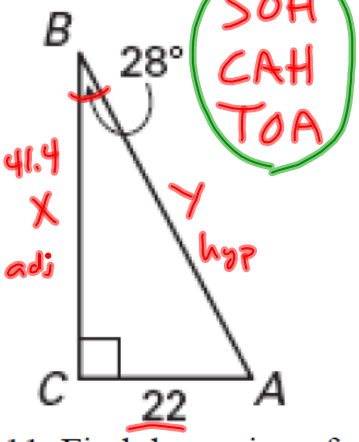
$x = \frac{10}{\cos(60^\circ)} = \frac{10}{0.5} = 20$

$\tan(60^\circ) = \frac{y}{10}$

$10 * \tan(60^\circ) = y$

$17.3 = y$

10. Find the perimeter of the triangle.



SOH
CAH
TOA

$\tan(28^\circ) = \frac{opp}{adj} = \frac{22}{x}$

$x \cdot \tan(28^\circ) = 22$

$x = 22/\tan(28^\circ) = 41.4$

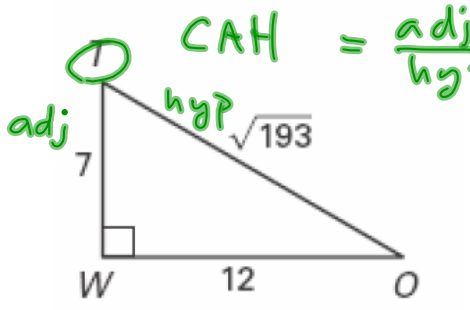
$\sin(28^\circ) = \frac{opp}{hyp} = \frac{22}{y}$

$y \cdot \sin(28^\circ) = 22$

$y = 22/\sin(28^\circ) = 46.9$

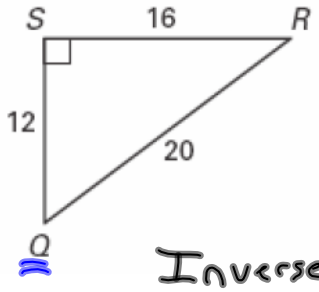
22
41.4
+ 46.9
= 110.3

11. Find the cosine of $\angle T$. Round to four decimal places.



CAH $= \frac{adj}{hyp} = \frac{7}{\sqrt{193}} = 0.5039$

12. Find the measure of ∠Q.

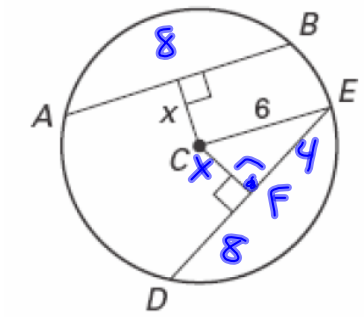


$\tan(Q) = \frac{opp}{adj} = \frac{16}{12}$

$\tan^{-1}\left(\frac{16}{12}\right) = m\angle Q = 53.1°$

≅ Inverse trig functions

15. Find x, given AB = DE = 8 and radius = 6.



Equal chords are equidistant from the center of the circle.

$EF = \frac{1}{2} ED$

$EF = \frac{1}{2}(8) = 4$

$leg^2 + leg^2 = hyp^2$

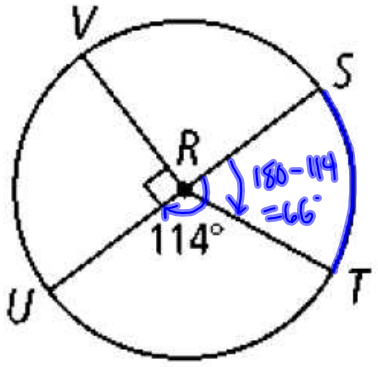
$x^2 + 4^2 = 6^2$

$x^2 + 16 = 36$

$x^2 = 36 - 16 = 20$

$x = \sqrt{20} = 2\sqrt{5}$ or ≈ 4.5

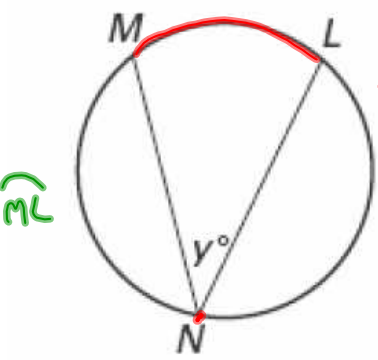
16. Find $\overset{\frown}{ST}$.



$\overset{\frown}{ST} = m\angle SRT = 66°$

Arc measure degrees

17. If $m\overset{\frown}{LNM} = 240°$, find the value of y



$m\angle N = \frac{1}{2}$(intercepted arc)

$\overset{\frown}{ML} = 360 - 240 = 120$

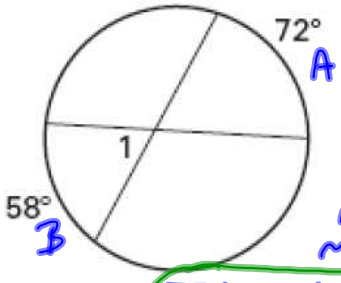
$m\angle N = \frac{1}{2}(\overset{\frown}{ML}) = \frac{1}{2}(120°) = 60°$

$y = 60°$

$y = \frac{1}{2}\overset{\frown}{ML}$

18. Find the measure of the marked angle in each diagram.

(a)



$m\angle 1 = \frac{1}{2}(A+B)$

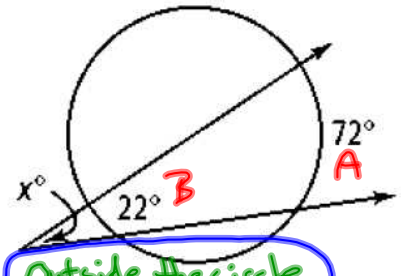
$m\angle 1 = \frac{1}{2}(72^\circ + 28^\circ)$

$m\angle 1 = \frac{1}{2}(130^\circ)$

$m\angle 1 = 65^\circ$

Intersecting lines: $m\angle 1 = \frac{1}{2}(A+B)$

(b)



Outside the circle

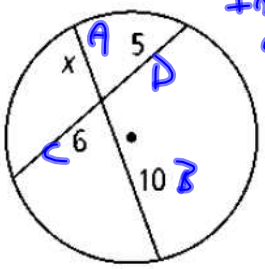
$x^\circ = \frac{1}{2}(A-B)$

$x^\circ = \frac{1}{2}(72^\circ - 22^\circ)$

$x^\circ = \frac{1}{2}(50)$

$x = 25^\circ$

19. Find the value of x.



Intersecting lines: the lengths of the segments are proportional.

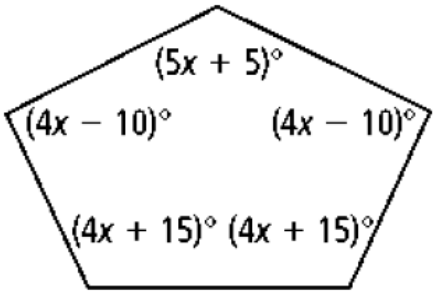
$A \cdot B = C \cdot D$ or $\frac{A}{D} = \frac{C}{B}$

$x \cdot 10 = 6 \cdot 5$

$x = \frac{30}{10}$

$x = 3$

20.



$540^\circ = 5x+5+4x-10+4x+15+4x+15+4x-10$

$540^\circ = 21x+15$

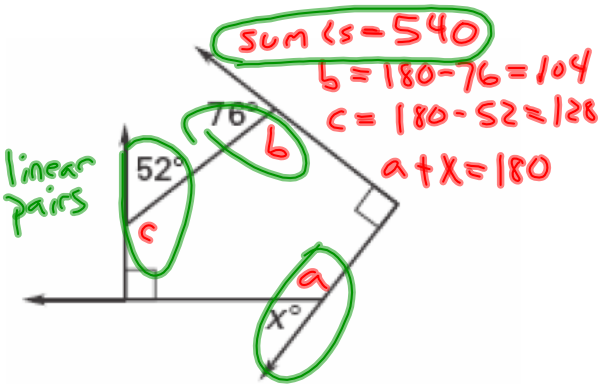
$525^\circ = 21x$

$25^\circ = x$

Sum interior $\angle$s is $(n-2)*180$ (n = number of sides)

$(5-2)(180) = 540^\circ$

21. Find the value of x.



sum $\angle$s = 540

$b = 180 - 76 = 104$

$c = 180 - 52 = 128$

$a + x = 180$

linear pairs

$a+b+c+180 = 540$

$a+b+c = 360$

$a+104+128 = 360$

$a = 128$

$x = 180 - a$

$= 180 - 128$

$= 52^\circ$

22. What is the approximate area of the inscribed regular polygon shown to the right?

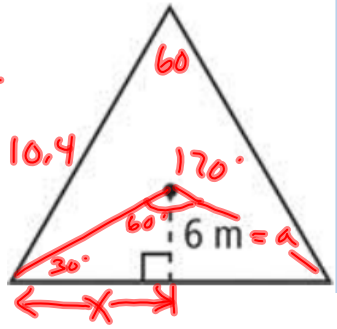
$A = \frac{1}{2}a \cdot P$

$A = \frac{1}{2}(6)(62.4)$

$= 187.1$

$\tan(30) = \frac{6}{x}$

$x = \frac{6}{\tan(30)} = 10.4$



10.4 or $6\sqrt{3}$

(Look up in classnotes)
① Central angle
② Wedge triangle

23. The ratio of the side lengths of two similar triangles is 3:5. What is the ratio of their:

(a) perimeters

3/5

$\frac{3}{5}$ $\frac{3'}{5'} = \frac{3}{5}$

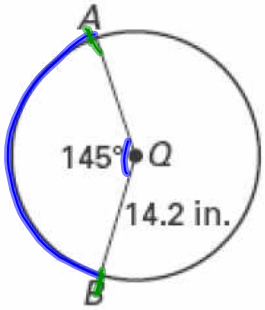
(b) areas

$\frac{3^2}{5^2} = \frac{9}{25}$

(c) volumes

$\frac{3^3}{5^3} = \frac{27}{125}$

24. Find the length of $\overset{\frown}{AB}$.



Circle fraction * Circumference = arc length

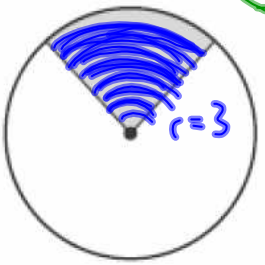
$\frac{\text{part}}{\text{whole}} = \frac{145°}{360°}$ * $2\pi r$

$2\pi(14.2)$

Arc length = $\left(\frac{145°}{360°}\right)(2\pi)(14.2) = 35.9$ in

ft, cm, in

25. Find the radius of the circle if the area of the shaded region is 5.5 in^2.



Circle fraction

$\frac{70°}{360°}$

$A_s = 5.5$

$A_s = \pi r^2 * \text{circle fraction}$

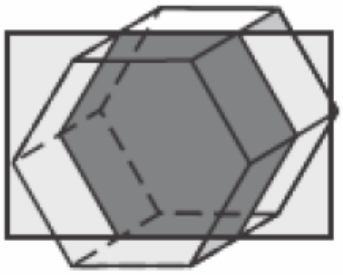
$5.5 = (\pi r^2)\left(\frac{70}{360}\right)$

$\left(\frac{5.5}{\pi}\right)\left(\frac{360}{70}\right) = r^2$

$9 = r^2$

$3 = r$

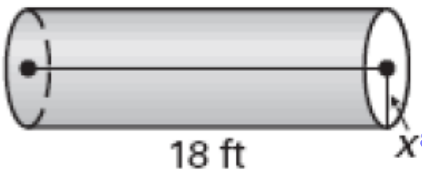
26. Describe the cross section of the figure shown.



Hexagon

Shape is the same as the base

27. What is the value of x if the cylinder has a volume of 475ft^3?



$Volume_c = \pi r^2 \cdot l$

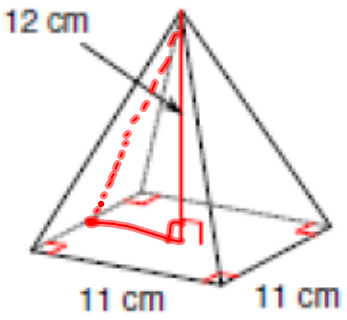
$475ft^3 = \pi r^2 \cdot (18ft)$

$x = 2.5ft$ $\frac{475ft^3}{18\pi ft} = r^2$

$8.4ft^2 = r^2$

$2.9ft = r$

28. Find the volume of the pyramid.



$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(121)(12) = 484cm^3$

Find the surface area.

$SA = LA + B = 290.4 + 121 = 411.4$

$LA = \frac{1}{2}p \cdot l$

$LA = 1/2(44)(13.2) = 290.4$

$l^2 = 12^2 + \left(\frac{11}{2}\right)^2$ $l = \sqrt{144 + \frac{121}{4}} = 13.2$

$B = 11^2 = 121$

29. Two pyramids are similar with a scale factor of 1:3.
Find the volume of the first pyramid given that the volume of the second is 135ft^3.

vol $\frac{1}{3} = \frac{1^3}{3^3} = \frac{1}{27}$ ← volume ratio

$\frac{1}{3}$ $\frac{V_1}{V_2}$ $\frac{1}{27} = \frac{x}{135}$ $5ft^3 = x$

30. What is the probability of rolling a number greater than 4 on a cube?

$P(\text{one side}) = \frac{1}{6}$ $P(A \text{ or } B) = P(A) + P(B) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$

$P(5 \text{ or } 6)$ $P(5) = \frac{1}{6}$ $P(6) = \frac{1}{6}$

33. In one class, 12% of the students received an A on the last test and 16% of the students received a C. What is the probability that a randomly chosen student received an A or a C?

$P(A) = 12\%$ or $.12$

$P(B) = 16\%$ or $.16$

$P(A \text{ or } B) = P(A) + P(B)$

$= .12 + .16 = .28$ or 28%

For questions, 31 and 32 use the table below. The table below shows the results of a soccer team's scores for games played this season.

Zero goals

Goals	0	1	2	3
Frequency	4	8	6	3

Games →

31. How many games did the team play?

Total = $4 + 8 + 6 + 3 = 21$

32. What is the relative frequency of games with 0 goals scored?

$\text{Frequency} = \frac{\text{part}}{\text{whole}} = \frac{4}{21}$

34. The table below shows the number of freshmen, sophomores, juniors, and seniors involved in basketball, soccer, and volleyball. What is the probability that a randomly selected student is a freshman or plays soccer?

Sport	Freshmen	Sophomores	Juniors	Seniors	Total:
Basketball	7	6	5	6	24
Soccer	6	4	8	7	25
Volleyball	9	2	4	6	21
Total:	22	12	17	19	70

25 play soccer

overlap

22 freshman

Probability = P(A) + P(B) − P(A and B)

$= \frac{22}{70} + \frac{25}{70} - \frac{6}{70} = \frac{41}{70}$

70 total students

What is the probability that a randomly chosen student is a sophomore or plays volleyball?

70 total students

2 "overlap" < 12 sophomores, 21 volleyball players

$\frac{12+21-2}{70} = \frac{31}{70}$

What is the probability that a randomly selected senior plays basketball?

19 seniors

6 of them play basketball

$\frac{6}{19}$

35. Shannon will be assigned at random to 1 of 7 math classes throughout the day and 1 of 3 lunch times. What is the probability that she will be in the third math class and the third lunch?

$P(A \text{ and } B) = P(A) * P(B) = \frac{1}{7} * \frac{1}{3} = \frac{1}{21}$

$P(\text{math class}) = \frac{1}{7} = P(A)$

$P(\text{lunch}) = \frac{1}{3} = P(B)$